

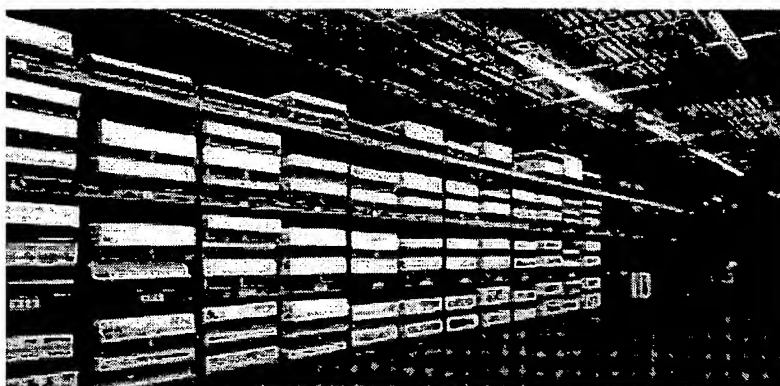
EXHIBIT "B"

SERIAL NO.: 10/041,111

DOCKET: TUC920000094US1

# **SAN DIEGO PLASTICS, INC.**

## **POLYETHYLENE**



**Polyethylene is used more than any other thermoplastic polymer. There is a wide variety of grades and formulations available that have an equally wide range of properties. In general, the outstanding characteristics of polyethylene are:**

**Toughness  
Ease of processing  
Chemical resistance  
Abrasion resistance  
Electrical properties  
Impact resistance  
Low coefficient of friction  
Near-zero moisture absorption**

**The three most commonly used grades of polyolefin are: Low Density, High Density and Polypropylene.**

### **LOW DENSITY POLYETHYLENE (LDPE)**

**LDPE, was the first of the polyethylenes to be developed. It is a corrosion resistant, low density extruded material that provides low moisture permeability. LDPE has a fairly low working temperature, soft surface and low tensile strength. It is an excellent material where corrosion resistance is an important factor, but stiffness, high temperature and structural strength are not important considerations.**

**Features  
Lightweight  
Formable  
Impact Resistant  
Excellent Electrical Properties  
Machinable  
Weldable**

**Fabrication  
LDPE can be fabricated using the following techniques.**

**Hot gas welded  
Fusion and butt welded  
Ultra-sonic sealed  
Die cut  
Machined with wood or metal working tools  
Vacuum formed  
Thermo-formed**

**Applications  
Chemical resistant tank and containers  
Food storage containers  
Laboratory equipment  
Disposable Thermo-formed products  
Corrosion resistant work surfaces  
Vacuum formed end caps and tops  
Moisture barrier**



### **HIGH DENSITY POLYETHYLENE (HDPE)**

**HDPE is more rigid and harder than lower density materials. It also has a higher tensile strength, four times that of low density polyethylene, and it is three times better in compressive strength. HDPE meets FDA requirements for direct food contact applications. It also is accepted by USDA, NSF and the Canadian Department of Agriculture.**

#### **Features**

##### **Abrasion Resistant**

**The extremely high molecular weight of HDPE combined with its very low coefficient of friction provides an excellent abrasion resistant product preventing gouging, scuffing and scraping.**

##### **Exceptional Impact Strength**

**HDPE is one of the highest impact resistant thermoplastics available and maintains excellent machinability and self-lubricating characteristics. Properties are maintained even at extremely low temperatures.**

##### **Chemical Resistant**

**HDPE has very good chemical resistance of corrosives as well as stress cracking resistance (with the exception of strong oxidizing acids at elevated temperatures). Certain hydrocarbons cause only a light surface swelling at moderate temperature.**

##### **Water Resistant**

**Moisture and water (including saltwater) have no affect on HDPE. It can be used in fresh and salt water immersion applications.**

#### **Fabrication**

**HDPE can be fabricated using the following techniques:**

**Hot gas welded**  
**Fusion and butt welded**  
**Ultra-sonic sealed**  
**Die cut**  
**Machined with wood or metal working tools**  
**Vacuum formed**  
**Thermo-formed**

#### **HIGH DENSITY POLYETHYLENE (HPDE) APPLICATIONS**

- Food cutting boards
- Corrosion resistant wall coverings
  - Pipe flanges
  - Lavatory partitions
- Man-hole covers in Chemical Plants
  - Radiation shielding
- Self supporting containers
- Prosthetic devices

#### **Typical properties of polyethylene**

ASTM test	Property	Low density	Medium density	High density	Ultrahigh molecular weight
<b>PHYSICAL</b>					
D792	Specific gravity	0.910-0.925	0.926-0.940	0.941-0.965	0.928-0.941
D792	Specific volume (in. <sup>3</sup> /lb.)	30.4-29.9	29.9-29.4	29.4-28.7	29.4
D570	Water absorption, 24 hours, 1/8 inch thick (%)	<0.01	<0.01	<0.01	<0.01
<b>MECHANICAL</b>					
D638	Tensile strength (psi)	600-2,300	1,200-3,500	3,100-5,500	4,000-6,000
D638	Elongation (%)	90-800	50-600	20-1,000	200-500
D638	Tensile modulus (10~5 psi)	0.14-0.38	0.25-0.55	0.6-1.8	0.20-1.10
D790	Flexural modulus (10~5 psi)	0.08-0.60	0.60-1.15	1.0-2.0	1.0-1.7
D256	Impact strength, izod (ft-lb/in. of notch)	No break	0.5-16	0.5-20	No break
D785	Hardness, Rockwell R	10	15	65	67
<b>THERMAL</b>					
C177	Thermal conductivity (10~4 cal-cm/sec-cm~2-°C)	8.0	8.0-10.0	11.0-12.4	11.0
D696	Coefficient of thermal expansion (10~5 in./in.-°F)	5.6-12.2	7.8-8.9	6.1-7.2	7.8
D648	Deflection temperature (°F) At 264 psi	90-105	105-120	110-130	118

	At 66 psi	100-121	120-165	140-190	170
<b>ELECTRICAL</b>					
D149	Dielectric strength (V/mil) short time, 1/8-in. thick	460-700	460-650	450-500	900 kV/cm
D150	Dielectric constant At 1kHz	2.25-2.35	2.25-2.35	2.30-2.35	2.30-2.35
D150	Dissipation factor At 1kHz	0.0002	0.0002	0.0003	0.0002
D257	Volume resistivity (ohm-cm) At 73°F, 50% RH	10~15	10~15	10~15	10~18
D495	Arc resistance(s)	135-160	200-235	-	-
<b>OPTICAL</b>					
D542	Refractive index	1.51	1.52	1.54	-
D1003	Transmittance (%)	4-50	4-50	10-50	-



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